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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/577,220

04/26/2006

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EXAMINER

BEST, ZACHARY P

ART UNIT

PAPER NUMBER

1795

MAIL DATE

DELIVERY MODE

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/577,220	<b>Applicant(s)</b> FUNATO ET AL.	
	<b>Examiner</b> Zachary Best	<b>Art Unit</b> 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 05 November 2008.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) 6-8 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>20080801</u> .  | 6) <input type="checkbox"/> Other: _____                          |

**LEAD-ACID BATTERY AND MANUFACTURING METHOD THEREOF**

Examiner: Z. Best    S.N. 10/577,220    Art Unit: 1795    February 9, 2009

**DETAILED ACTION**

1. Applicant's amendment filed on November 5, 2008 was received. The specification was amended. Claims 1 and 3 were amended. Claims 6-8 were withdrawn.
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

***Claim Objections***

3. The objections to Claims 2-3 are withdrawn because Claims 1 and 3 were amended.

***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-3 are rejected under 35 U.S.C. 102(b) as being anticipated by Laird et al.  
(Laird, Edwin C., Samir B. Hanna. "Analysis of 4.5 mol/L sulfuric acid for organic compounds leached from battery separators." National Bureau of Standards Special

Publication 519. Trace Organic Analysis: A New Frontier in Analytical Chemistry.

Proceedings of the 9<sup>th</sup> Materials Research Symposium. 797-802. April 10-13, 1978, held at NBS, Gaithersburg, MD. Issued April, 1979.)

Regarding Claims 1-3, Laird et al. teaches a lead-acid battery separators made from phenol-formaldehyde resin-impregnated cellulose will leach organic compounds when in a 4.5 mol/L sulfuric acid (pg. 797), wherein the concentration of volatile formic acid leached from said separator is 200 mg/L (pg. 801, table 2).

***Claim Rejections - 35 USC § 102 / 103***

6. Claims 1-3 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Fujita (US 5,677,075 A).

Regarding Claims 1-3, Fujita teaches a lead-acid battery which comprises a positive electrode, a negative electrode, a separator, and an electrolyte (col. 16, lines 22-51), wherein said electrolyte contains a volatile organic acid, such as carboxylic acid (col. 3, lines 33-35). Although Fujita does not specifically teach the content of said volatile organic acid is equal to 250 mg or higher per liter of said electrolyte, it is Examiner's position that the lead-acid battery of Fujita would meet said limitation because the electrolyte solution starts as a water with a pH of 7 (col. 10, line 23) and through the presence of carboxylic acid (HCOOH) (col. 3, lines 33-35) drops down to a pH of 2-3 (col. 11, lines 1-3). Fujita further teach the amount of carbon powder that is used to create the carboxylic acid is 3.1 wt% of the solution (col. 10, lines 33-34) and the amount of solution added to the lead acid battery may

be as low as 1-3 vol% of the lead acid battery electrolyte (col. 12, lines 4-8). It is noted that 250 mg/L of formic acid in water is approximately 0.025wt%. A reference that is silent about a claimed invention's features is inherently anticipatory if the missing feature is necessarily present in that which is described in the reference. *In Re Roberston* 49 USPQ2d 1949 (1999).

Alternatively, it would have been obvious to one having ordinary skill in the art at the time the invention was made to adjust the amount of the carbon solution, thereby adjusting the amount of carboxylic acid in the battery of Fujita because the acidity of the solution affects the conductivity of the solution (col. 3, lines 64 - col. 4, line 21) and the amount of carbon solution in the battery affects the internal resistance of the battery (col. 8, line 64 – col. 9, line 10, see also Example 10). Discovery of an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272 (CCPA 1980).

### ***Claim Rejections - 35 USC § 103***

7. Claims 4-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujita, as applied to Claims 1-3, and further in view of O'Rell et al. (US 4,216,281).

Regarding Claims 4-5, Fujita teaches the lead acid battery as recited in paragraph 6 above. However, Fujita fails to teach said separator contains a surfactant or is composed of polyethylene.

O'Rell et al. teach a lead acid battery separator (claim 1), wherein said separator is composed of polyethylene due to its high branching or fibrillation (col. 3, lines 22-36) and contains a surfactant to reduce the electrical resistance of the separator (col. 4, lines 48-60).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to create the lead acid battery of Fujita, wherein the separator is composed of polyethylene and has a surfactant because O'Rell et al. teach the polyethylene has high branching or fibrillation properties and the surfactant will reduce the electrical resistance of the separator.

### ***Response to Arguments***

8. Applicant's arguments filed on November 5, 2008 have been fully considered, but they are not persuasive:

*Applicant argues:*

*(a) the pH of the electrolyte of Fujita changes due to the carboxyl group attached to carbon surface;*

In response to Applicant's arguments:

(a) Fujita specifically state "[i]n actual, when water is used as an electrolyte solution to electrolytically oxidize carbone, the pH value of the electrolyte solution shifts to 2 to 3 on the side of acidity. Take the above fact in to consideration, it seems that the original form of acid is carboxylic acid" (col. 3, lines 31-35). The simplest form of carboxylic acid is HCOOH (formic acid).

***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zachary Best whose telephone number is (571) 270-3963. The examiner can normally be reached on Monday to Thursday, 7:30 - 5:00 (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dah-Wei Yuan can be reached on (571) 272-1295. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1795

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

zpb

/Dah-Wei D. Yuan/  
Supervisory Patent Examiner, Art Unit 1795